

選擇題請於答案卷內「選擇題作答區」作答。

一、單選題（每題 2 分）

1. After telophase I of meiosis, what is the chromosomal makeup of each daughter cell?  
A) diploid, and the chromosomes are composed of two chromatids  
B) haploid, and the chromosomes are composed of single chromatid chromosomes  
C) diploid, and the chromosomes are composed of single chromatid chromosomes  
D) tetraploid, and the chromosome are composed of two chromatids  
E) haploid, and the chromosomes are composed of two chromatids
2. If crossing-over does not occur, a human male can produce how many genetically unique sperm cells as a result of meiosis?  
A) 23    B)  $2 \times 23$     C)  $2^{23}$     D)  $23^2$     E)  $2^{46}$
3. Which of the following is a correct functional group pair?  
A) hydroxyl :: hydrophobic    B) methyl :: hydrophilic  
C) sulfhydryl :: hydrophobic    D) carbonyl :: hydrophilic  
E) phosphate :: hydrophobic
4. Which of the following is **NOT** part of the cell's endomembrane system?  
A) endosomes    B) peroxisome    C) rough endoplasmic reticulum  
D) smooth endoplasmic reticulum    E) nuclear membrane
5. Choose the correct complementary strand of this DNA sequence 5'-ATCCAAGC-3'.  
A) 5'-TAGGTTTCG-3'    B) 3'-GCTTGGAT-5'  
C) 5'-GCTTGGAT-3'    D) 3'-ATCCAAGC-5'  
E) 5'-CGAACCTA-3'
6. When acetyl-CoA combines with oxaloacetate in the Krebs cycle, a 6-carbon compound, \_\_\_\_\_, is formed.  
A) citric acid    B) fumaric acid    C) glyceraldehyde-3-phosphate  
D) malic acid    E) pyruvic acid
7. You find that the label on a container says it contains only "hydrogenated vegetable oil." This means that during processing the number of carbon-carbon double bonds was decreased chemically. What is the result of this modification?  
A) The triglycerides now contain fatty acids  
B) The oil remains a liquid at room temperature  
C) The oil now contains less cholesterol  
D) The oil contains more *cis* form fatty acids than original  
E) The oil contains more *trans* form fatty acids than original
8. Which statement about osmosis is **NOT** true?  
A) It obeys the laws of diffusion  
B) Red blood cells must be kept in plasma (extracellular fluid) which is hyperosmotic  
C) In animal tissues, water moves to the cells with the most negative osmotic potential  
D) Solute concentration is the principle factor in osmotic potential  
E) Two cells with identical osmotic potentials are isosmotic to each other

接背面

9. Which one of the following does **NOT** happen to eukaryotic RNA?  
A) Introns are added to the RNA  
B) Exons are spliced together  
C) A small cap of extra nucleotides is added to one end of the RNA  
D) A long tail of extra nucleotides is added to the other end of the RNA  
E) The completed RNA molecule is exported out of the nucleus.
10. Genetic differences between populations tend to be reduced by \_\_\_\_\_.  
A) the bottleneck effect      B) mutation      C) the founder effect  
D) gene flow      E) None of the choices are correct
11. Which of the following tissues can be found in tendons?  
A) Bone      B) Cartilage  
C) Loose connective tissue      D) Fibrous connective tissue
12. Which of the following is the best example of an effector's response in negative feedback?  
A) An increase in body temperature resulting from fever  
B) An increase in body temperature resulting from exercise  
C) An increase in body temperature resulting from shivering  
D) An increase in body temperature resulting from exposure to the sun
13. What is peristalsis?  
A) a process of fat emulsification in the small intestine  
B) voluntary control of the rectal sphincters regulating defecation  
C) the transport of nutrients to the liver through the hepatic portal vein  
D) smooth muscle contractions that move food through the alimentary canal
14. What are essential amino acids?  
A) Those that are absent in fruits and vegetables  
B) The only amino acids found in human proteins  
C) The amino acids can not be synthesized by the most animals  
D) Those amino acids are more abundant in vegetables than in meat
15. Which of the following structures is the inmost layer of blood vessels?  
A) connective tissue      B) smooth muscle  
C) nerve cells      D) endothelial cells
16. Which of the following chambers or vessels that carries oxygenated blood?  
A) left atrium, left ventricle, and aorta  
B) right atrium, left ventricle, and vena cava  
C) left atrium, left ventricle, and pulmonary artery  
D) right atrium, right ventricle, and pulmonary vein
17. Which hormone exerts antagonistic action to parathyroid hormone (PTH)?  
A) thyroxin      B) epinephrine  
C) glucagon      D) calcitonin
18. Blood samples taken from an individual who had been fasting for 24 hours would have

which of the following?

- A) high levels of epinephrine                      B) low levels of insulin  
C) high levels of thyroxin                        D) Low levels of glucagon

19. Which of the following human structures is incorrectly matched to its function?

- A) oviduct-fertilization site of egg  
B) seminal vesicles- storage of sperm  
C) placenta-maternal/fetal exchange organ  
D) prostate gland-adds alkaline substances to semen

20. One function of the corpus luteum is to

- A) nourish and protect the egg cell                      B) stimulate ovulation  
C) produce progesterone and estrogen                      D) produce testosterone

二. 名詞解釋 (每題 5 分)

1. Operon
2. Ribozyme
3. Kinetochore
4. Monoclonal antibody
5. Countercurrent exchange
6. Apoptosis

三. 問答題 (30 分)

1. 試述三種「細胞骨架 (cytoskeleton)」的組成方式，並各舉一實例說明其功能。(15 分)
2. 試述神經細胞內及神經細胞間單方向神經傳導的機制。(15 分)

試題必須隨卷繳回